United States Environmental Protection Agency
Air and Radiation (6202J)
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VALUE-ENGINEERED FRAMING

BUILDING ENVELOPE IMPROVEMENT

The U.S. Environmental Protection Agency's **ENERGY STAR® Program** promotes the use of high-efficiency technologies and equipment. ENERGY STAR labeled homes use at least 30% less energy than homes built to meet the national Model Energy Code while maintaining or improving indoor air quality. These fact sheets are designed to help consumers learn more about the energy-efficient improvements to their ENERGY STAR labeled homes.

An effective building envelope is a key element for an energy-efficient home. Value-engineered framing increases the thermal resistance of the building envelope without compromising structural integrity by eliminating unnecessary framing members. This can result in up to 25 percent reduction in the amount of wood used. With lumber prices high, optimizing the use of wood can significantly lower the framing cost and reduce the resource impact of new home construction.

Wood loses or gains heat more quickly than insulation. In frame construction, studs, joists and rafters are placed at regular intervals throughout the building envelope. The cavities formed by these framing members are filled with insulation. The unnecessary use of wood displaces insulation and degrades the thermal efficiency of the building envelope.

Standard construction practice places framing members at 16 inches on center. Most building codes allow this spacing to be increased to 24 inches by using deeper framing members (i.e. 2x6's instead of 2x4's). This also reduces labor costs.

The size and location of doors and windows has an impact on the thermal efficiency of the building envelope. Figure 1 shows a window opening in standard framed wall. The location of the window opening requires the installation of additional studs to support the frame. By utilizing value-engineered framing and adjusting the location of the window opening as shown in Figure 2, the unnecessary studs are eliminated.

At exterior corners and the intersection of interior partitions and exterior walls, additional studs are required to support the drywall. Figures 3 and 4 show how these studs create pockets that are difficult to insulate and air seal. By making the modifications shown in Figures 5 and 6, these pockets are eliminated. Using "drywall stops" can further increase the thermal efficiency at these locations.

Look for ENERGY STAR labeled homes to include value-engineered framing for improved thermal performance of the building envelope.

FIGURE 1: STANDARD FRAMING AT WINDOW

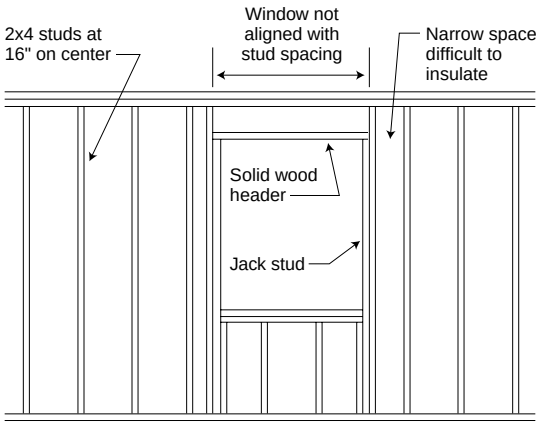
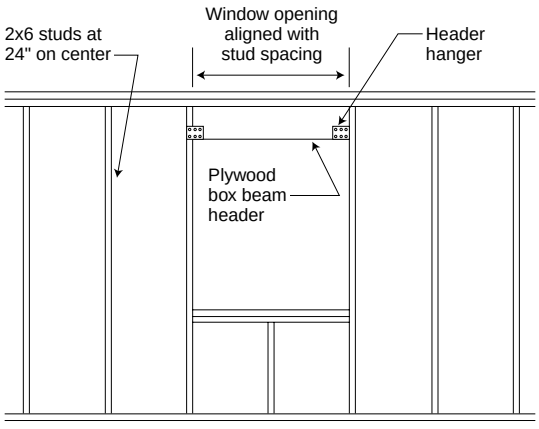


FIGURE 2: VALUE-ENGINEERED FRAMING AT WINDOW



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RESOURCES

The following fact sheets are available by calling the U.S. Environmental Protection Agency's toll-free ENERGY STAR Hotline at 1-888-STAR-YES (1-888-782-7937): ***Increased Insulation*** and ***Air Sealing***

BENEFITS

Value-engineered framing can provide many benefits including:

Improved comfort. By increasing wall insulation and eliminating air spaces, value-engineered framing increases the overall R-value and integrity of the building envelope. This results in walls that are warmer in winter and cooler in summer. This is important because approximately 40 percent of our physical comfort is due to the radiant heat exchange between our bodies and the surrounding interior surfaces. Value-engineered framing reduces this radiant heat exchange, thus maintaining a more consistent level of comfort throughout a house.

Reduced construction cost. Value-engineered framing can reduce the amount of lumber and labor needed to construct a home. This results in construction cost savings.

Lower utility bills. Value-engineered framing reduces the amount of heat and air that flows through the building envelope. This results in lower utility bills, making homes less expensive to operate.

FIGURE 3: STANDARD FRAMING AT CORNER

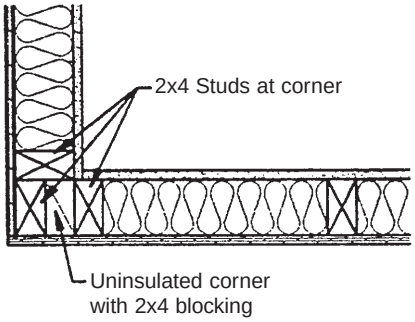

FIGURE 5: VALUE-ENGINEERED FRAMING AT CORNER

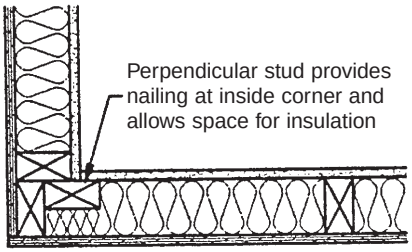

FIGURE 4: STANDARD FRAMING AT INTERSECTION

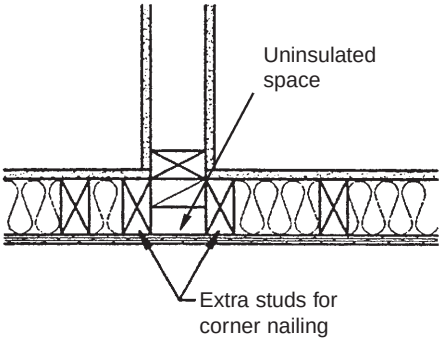

FIGURE 6: VALUE-ENGINEERED FRAMING AT INTERSECTION